IN THE CLAIMS:

Please cancel claims 1 to 25 and insert

26. A process for manufacturing a single part fibre-reinforced component having at least one closed or undercut hollow space, comprising the steps of:

manufacturing a shape-stable supporting core by plastic deformation from one of a core mass and a preform so as to create the hollow space in the fibre-reinforced component, the supporting core being a shaped part that is meltable above room temperature;

charging a mould with a cavity at least with fibre material and the supporting core;

injecting a flowable plastic matrix into the cavity of the mould thereby soaking the fibre material and forming a shaped fibre-composite mass;

hardening the fibre-composite mass thereby resulting in a fibre-reinforced component; and

melting the supporting core out of the fibre-reinforced component when the component has reached a stable shape containing a closed or undercut hollow space.

27. A process according to claim 26, including plastically shape-forming the supporting core out of a preform.

28. A process according to claim 27, wherein the preform is cast.

29. A process according to claim 28, wherein the preform is cast in a rough shape of a final supporting core shape.

30. A process according to claim 29, including choosing the shape of the preform so that distances the material has to flow during plastic shape-forming are as small as possible and the preform has at least an equal mass with the supporting core being manufactured.

31. A process according to claim 30, wherein the preform has a greater mass than the supporting core.

32. A process according to claim 26, including plastically shape-forming the core mass or the preform at an average temperature greater than 20°C and less than a melting temperature of the core mass or preform, whereby the melting temperature is above 50°C.

33. A process according to claim 32, including plastically shape-forming at an average temperature greater than 35°C.

34. A process according to claim 33, including plastically shape-forming at an average temperature greater than 50°C.

35. A process according to claim 26, wherein the supporting core manufacturing step includes manufacturing the supporting core to contain wax.

36. A process according to claim 35, wherein the wax is one of natural wax, chemically modified wax and synthetic wax.

37. A process according to claim 35, wherein the support core is comprised substantially of wax.

38. A process according to claim 32, wherein the core mass or preform has a melting temperature which is at least 75°C and at most 130°C, and the process including plastically forming the core mass or preform from a temperature of at least 20°C up to the melting temperature.

39. A process according to claim 38, wherein the mass or preform has a melting temperature of at least 85°C.

40. A process according to claim 39, wherein the mass or preform has a melting temperature of at least 90°C.

41. A process according to claim 38, wherein the core mass or preform has a melting temperature of at most 120°C.

42. A process according to claim 41, wherein the core mass or preform has a melting temperature of at most 110°C.

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43. A process according to claim 38, including plastically forming the core mass or preform from a temperature of at least 30°C up to the melting temperature.

44. A process according to claim 43, including plastically forming the core mass or preform from a temperature of at least 50°C up to the melting temperature.

45. A process according to claim 26, wherein the supporting core manufacturing step includes manufacturing the supporting core via press-moulding and shape-forming in a cavity of a press-moulding tool.

46. A process according to claim 45, wherein the press-moulding tool has a multi-part mold.

47. A process according to claim 46, wherein the press-moulding tool has a two-part mold, the supporting core manufacturing step including laying the core mass or preform in the open mould cavity and pressing the core mass or preform by bringing the mould parts together and closing the press moulding tool into the shape of the cavity and thereby giving the supporting core a final shape.

48. A process according to claim 26, including laying the preform into an open two-part press moulding tool which forms a tool cavity, the press moulding tool parts forming cavity parts and the press moulding tool cavity making up the hollow space in the fibre-reinforced

component to be manufactured, further including closing the press moulding tool to press the core mass or preform by shape forming into the contour of the press moulding tool cavity to give a shaped supporting core.

49. A process according to claim 45, wherein the core mass or preform exhibits excess material with respect to the final, shaped supporting core and the excess material flows out of the cavity via openings during the press-mould forming, the cavity containing degassing openings to remove trapped pockets of air during the press-mould forming.

50. A process according to claim 26, further including forming a new preform out of the supporting core material removed by melting and leading the molten material from the supporting core directly into a casting mould for producing a new preform.

51. A process according to claim 26, wherein an average temperature of the supporting core during the injection of the plastic matrix into the mould deviates by less than ± 6°C from an average temperature of the core mass or preform during plastic deformation.

52. A process according to claim 51, wherein the average temperature of the supporting core during the injection of the plastic matrix into the mold deviates by less than ± 4°C from the average temperature of the core mass or preform during plastic deformation.

53. A process according to claim 52, wherein the average temperature of the supporting core during the injection of the plastic matrix into the mold deviates by less than ± 2°C from the average temperature of the core mass or preform during plastic deformation.

54. A process according to claim 45, wherein an average temperature of the supporting core during the injecting of the plastic matrix into the moulding tool corresponds to an average temperature of the core mass or preform during plastic deformation.

55. A process according to claim 26, wherein an average temperature of the supporting core during the injecting of the plastic matrix into the mould is less than 6°C and more than 0°C higher than an average temperature of the core mass or preform during plastic deformation, and further including heating the supporting core one of during and after the injecting of the plastic matrix so that a thermal volume expansion towards the fibre-composite mass of more than 0% and less than 10% results so that pressure is exerted on the fibre-composite mass which leads to the plastic matrix effectively soaking into the fibre mass.

56. A process according to claim 55, wherein the average temperature of the supporting core during the injecting of the plastic matrix into the mould is less than 4°C higher than the average temperature of the core mass or preform during plastic deformation.

57. A process according to claim 56, wherein the average temperature of the supporting core during the injecting of the plastic matrix into the mould is less than 3°C higher than the average temperature of the core mass or preform during plastic deformation.

58. A process according to claim 55, wherein the average temperature of the supporting core during the injecting of the plastic matrix into the mould is more than 1°C higher than the average temperature of the core mass or preform during plastic deformation.

59. A process according to claim 58, wherein the average temperature of the supporting core during the injecting of the plastic matrix into the mould is more than 2°C higher than the average temperature of the core mass or preform during plastic deformation.

60. A process according to claim 55, wherein the thermal volume expansion towards the fibre-composite mass is more than 1%.

61. A process according to claim 60, wherein the thermal volume expansion towards the fibre-composite mass is less than 5%.

62. a process according to claim 61, wherein the thermal volume expansion towards the fibre-composite mass is less than 2%.

63. A process according to claim 26, including producing the fibre-reinforced component in a resin transfer moulding RTM process and the plastic matrix is of a duromer system, the injecting step including injecting the plastic matrix into a cavity of a multi-part RTM-tool at a temperature of about 60°C, the hardening step including hardening the plastic matrix at a temperature of about 70-80°C, and further including removing the fibre-reinforced component

from the mould and tempering the fibre-reinforced component at a temperature of about 90-110°C after removal from the mould, the supporting core being melted out of the fibre-reinforced component during the tempering process.

64. A process according to claim 63, wherein the plastic matrix is of an epoxy resin system.

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65. A process according to claim 26, wherein the fibre mass is a pre-formed fibre preform of textile material.

66. A process according to claim 26, wherein the fibre mass is substantially of glass fibres.

67. A process for manufacturing a supporting core for use in manufacturing fibre-reinforced components, the process comprising the step of plastically deforming one of a core mass and a preform so as to form a shaped body that is meltable at a temperature above ambient.

68. A process according to claim 67, including plastically forming the supporting core shaped body from a preform, the preform being cast in a rough shape of the final supporting core, the shape of the preform being such that distances that the material flows during plastic deformation are as short as possible, the preform having a mass which is at least equal to a mass of the supporting core to be produced.

69. A process according to claim 68, including plastically shape-forming the core mass or preform at an average temperature greater than 20°C and less than a melting temperature, the melting temperature being above 50°C.

70. A process according to claim 69, including plastically shape-forming the core mass or preform at an average temperature greater than 35°C.

71. A process according to claim 70, including plastically shape-forming the core mass or preform at an average temperature greater than 50°C.

72. A process according to claim 67, wherein the supporting core contains wax.

73. A process according to claim 72, wherein the wax is one of natural wax, chemically modified wax or synthetic wax.

74. A process according to claim 72, wherein the supporting core is comprised substantially of wax.

75. A process according to claim 69, wherein the core mass or preform has a melting temperature of at least 75°C and at most 130°C, the core mass or preform being plastically shape-formable from a temperature of at least 20°C up to the melting point.

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76. A process according to claim 75, wherein the core mass or preform has a melting temperature of at least 85°C.

77. A process according to claim 76, wherein the core mass or preform has a melting temperature of at least 90°C.

78. A process according to claim 75, wherein the core mass or preform has a melting temperature of at most 120°C.

79. A process according to claim 78, wherein the core mass or preform has a melting temperature of at most 110°C.

80. A process according to claim 75, wherein the core mass or preform is plastically shape-formable from a temperature of at least 30°C.

81. A process according to claim 80, wherein the core mass or preform is plastically shape-formable from a temperature of at least 50°C.

82. A process according to claim 67, including producing the supporting core by press moulding and forming in a cavity of a press moulding tool.

83. A process according to claim 82, wherein the press moulding tool has a multi-part mould.

84. A process according to claim 83, wherein the press moulding tool is a two-part moulding tool, the process including laying the core mass or preform in the open cavity of the tool and bringing together the mould parts and closing the press moulding tool so as to press the core mass or preform into the shape of the cavity and thus give the supporting core a final shape.

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85. A process according to claim 67, including laying the preform in an open two-part press moulding tool which forms a tool cavity, the press moulding tool parts forming cavity parts and the press moulding tool cavity making up the hollow space in the fibre-reinforced component to be manufactured, the process further including closing the press-moulding tool so as to press the preform by shape forming into the contour of the press-moulding tool cavity so as to form the supporting core.

86. A process according to claim 84, including forming the preform so that the preform has, with respect to a final shape of the supporting core, an excess of material which excess material flows, during plastic deformation, out of the press moulding to a cavity via openings, the press moulding tool cavity having degassing openings for removing trapped pockets of air.

87. A device for manufacturing a supporting core for use in manufacturing fibre-reinforced components, the device comprising a two-part press moulding tool movable between an open position and a closed position, the press moulding tool forming a cavity in the closed position, which cavity reproduces a hollow space in the fibre reinforced component to be produced.

88. A device according to claim 87, wherein the press moulding tool has degassing openings for permitting air to escape from trapped air pockets, the press moulding tool further having drainage openings leading to drainage chambers to permit drainage of excess material from the preform out of the tool cavity.

89. A single part fibre-reinforced component manufactured by producing a shape-stable supporting core by plastic deformation from one of a core mass and a preform so as to create the hollow space in the fibre-reinforced component, the supporting core being a shaped part that is meltable above room temperature, charging a mould with a cavity at least with fibre material and the supporting core, injecting a flowable plastic matrix into the cavity of the mould thereby soaking the fibre material and forming a shaped fibre-composite mass, hardening the fibre-composite mass thereby resulting in a fibre-reinforced component, and melting the supporting core out of the fibre-reinforced component when the component has reached a stable shape containing a closed or undercut hollow space, the fibre-reinforced component having a fibre content by volume of more than 30% and at least one closed or undercut space, the component further having a span of shape and dimensional tolerances that is less than 5% with reference to a nominal value.

IN THE ABSTRACT:

Please cancel the present abstract and insert the following therefore:

A Resin Transfer Moulding (RTM) process for manufacturing fibre-reinforced components with at least one closed or undercut space. A two-part mould with a cavity is charged with reinforcing fibres and a shape-stable supporting core of wax that can be melted out of the cavity. The core is produced from a cast preform by at least one shape-forming step. A plastic matrix capable of flowing is injected into the cavity of the closed mould forming a shaped fibre-composite mass and hardened to give the fibre-reinforced component. The shape-stable fibre-reinforced component is removed from the mould and subjected to tempering. During tempering the core is melted and drained off from the fibre-reinforced component - leaving behind a closed or undercut space – and the molten core material is cast to provide a new preform .

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